Short and Frequent Skin Contact with Nickel

Klara Midander, assistant professor
Work Environment Toxicology
Institute of Environmental Medicine, Karolinska Institutet
Many times, every day, throughout life
“prolonged contact with the skin”

defined by ECHA as

“potentially more than 10 minutes on three or more occasions within two weeks, or 30 minutes on one or more occasions within two week"
Selection of study material (what is found in our homes)

- 239 items were spot tested
  - 68 positive
  - 41 doubtful
  - 131 negative

Positive 28%
Negative 54%
Doubtful 18%
Study design

- **Touch tests**
  - skin, 3 healthy volunteers
  - 1 touch = 3 strokes, 3 seconds with fingertip

- **Wipe tests**
  - Paper tissue moistened with artificial sweat
  - 1 contact = 3 strokes, 3 seconds

- **Immersion test**
  - 3 seconds immersion in artificial sweat
Acid wipe sampling
Wipe extraction, chemical analysis

Extraction in 1% HNO₃
Orbital shaking:
100 rpm, 45 min

addition of internal standard

ICP-MS
Touch test vs Wipe test

Touch test

Wipe test

Ni quantified on skin after one single touch! (levels may cause CD)
Touch test vs Wipe test

Touch test

Wipe test

Ni skin doses higher when a surface is "touched for the very first time".
Immersion test

Ni release in artificial sweat < Ni release by wiping with artificial sweat (proxy for touch)

Release at immersion < skin dose from a touch
Outlook, new questions

- **How much metal do we carry on our skin?**
  → Presentation on the "Development, validation and test of a skin sampling method for assessment of metal exposure" (session 10b, Wednesday 21/9)

- **What is the fate of metals that is deposited on skin?**
  - penetration, retention, re-deposition, rinsing-off?

- **What is the effect of skin physiology?**
  - metal skin dose, fate
THANKS!

Acknowledgement:

Behnaz Erfani, MSc
Carola Lidén, Professor, MD

Short and frequent skin contact with nickel
Behnaz Erfani, Carola Lidén, Klara Midander
Contact Dermatitis 73(4) : 222-230 : 2105